KYRENE SCHOOL DISTRICT COOLING TOWER REPLACEMENT

FOR

KYRENE de la MARIPOSA ELEMENTARY SCHOOL



SHEET INDEX COVER SHEET DEMOLITION FLOOR PLAN NEW FLOOR PLAN AND DIAGRAM LEGEND, SCHEDULES AND DETAILS ELECTRICAL SYMBOLS LIST AND NOTES ELECTRICAL SITE PLAN ELECTRICAL DEMOLITION FLOOR PLAN NEW ELECTRICAL FLOOR PLAN ONE LINE DIAGRAM PARTIAL FOUNDATION PLAN

SCOPE OF WORK

- Remove and replace the existing cooling towers, tower supports, floor sink, etc.
- Install new galvanized cooling towers, structural tower supports, floor sink, etc. Reconfigure and reconnect towers (provide new BFV's at the towers), provide existing water make—up, electrical and controls.

ALTERNATE #1 BID

- Also remove and replace the pumps, piping, water treatment, floor sink, etc.
- Install new stainless steel cooling towers, pumps, piping, valves, VFD's, water treatment, heat exchanger, tower filters, new tower water make-up,
- All work indicated on these mechanical and electrical

KYRENE de la MARIPOSA ELEMENTARY SCHOOL

50 E. KNOX ROAD TEMPE, ARIZONA 85284

MECHANICAL AND ELECTRICAL ENGINEERS.



LSW ENGINEERS ARIZONA, INCORPORATED 2333 WEST NORTHERN AVENUE PHOENIX, ARIZONA 85021 (602) 249-1320

STRUCTURAL ENGINEERS

GERVASIO AND ASSOCIATES, INC. 77 E. THOMAS ROAD, STE 120 PHOENIX, ARIZONA 850152 (602) 285-1720

CODE DATA CITY OF TEMPE CODES

2006 INTERNATIONAL MECHANICAL CODE WITH AMENDMENTS 2006 INTERNATIONAL PLUMBING CODE WITH AMENDMENTS

2008 NATIONAL ELECTRICAL CODE WITH AMENDMENTS

2006 INTERNATIONAL BUILDING CODE WITH AMENDMENTS

2006 INTERNATIONAL ENERGY CONSERVATION CODE WITH AMENDMENTS

2006 INTERNATIONAL FIRE CODE

2006 INTERNATIONAL FUEL GAS CODE WITH AMENDMENTS

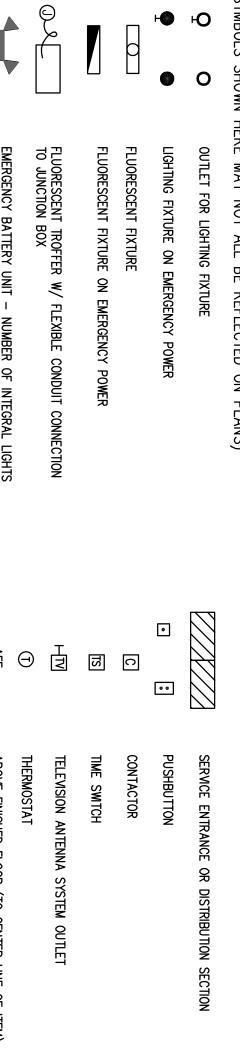


02/17/12

- EXISTING ELECTRICAL WIRING WHICH WILL NOT BE MADE OBSOLETE AND WHICH WILL BE DISTURBED DUE TO CONSTRUCTION CHANGES REQUIRED BY THIS CONTRACT SHALL BE RESTORED TO OPERATING CONDITION, AS REQUIRED AND/OR DIRECTED.WHERE REQUIRED, SHOWN AND/OR DIRECTED, OUTLETS AND CONDUIT RUNS SHALL BE RELOCATED.IN SOME CASES IT MAY BE NECESSARY TO EXTEND CONDUITS AND PULL IN NEW WIRING OR INSTALL JUNCTION BOXES AND SPLICE IN NEW WIRING OR REPLACE OLD WIRING WITH NEW.
- HES, RECEPTACLES, AND/OR OTHER ELECTRI-NE NOT REPLACED OR REUSED SHALL BE O REMOVE, PLACE A BLANK COVER ON THE TC., ARE COMPLETELY REMOVED, THE S AND REMOVE WIRING.
- WHERE EXISTING LIGHT FIXTURES ARE TO SHALL CLEAN AND REPLACE LAMPS, REBALLAST, ETC. AS REQUIRED. WHERE CONDUITS EXTENDING THROUGH CONTRACTOR SHALL CUT AND CAP OR ABOVE THE FLOOR. FLOOR SLABS ARE TO BE ABANDONED, THE PLUG CONDUIT SUCH THAT IT WILL NOT PROTRUDE O BE REUSED, THE ELECTRICAL CONTRACTOR
- WHERE EXISTING CONDUIT IS TO BE ABANDONED, THE CONDUIT SHALL BE REMOVED IF IT IS EXPOSED, IN A CRAWL SPACE OR IN AN ACCESSIBLE CEILING.WHERE IT IS IMPOSSIBLE TO REMOVE THE CONDUIT, IT SHALL BE CUT OFF AND CAPPED OR PLUGGED.

- THE CONTRACTOR SHALL BE HELD FULL'TION OF ALL EXISTING SURFACES REQUIRED. Y RESPONSIBLE FOR THE PROPER RESTORA-RING PATCHING, PLASTERING, PAINTING STALLATION OF ELECTRICAL WORK UNDER THE OPENINGS, REPAIR ALL SURFACES, ETC.,
- THE CONTRACTOR SHALL EMPLOY QUALIFIED AND EXPERIENCED WORKMEN FOR THIS WORK.ALL RESTORATION WORK SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER AND/OR THE OWNER.
- ALL TEMPORARY AND REMODELING WORK SHALL BE CONSIDERED A PART OF THIS CONTRACT AND NO EXTRA CHARGES WILL BE ALLOWED.THIS SHALL INCLUDE MINOR ITEMS OF MATERIAL OR EQUIPMENT NECESSARY TO MEET THE REQUIREMENTS AND INTENT OF THE PROJECT.
- EXAMINE MECHANICAL DRAWINGS AND SPECIFICATIONS TO DETERMINE THE SEQUENCE OF CONSTRUCTION THROUGHOUT THE PROJECT,

(SYMBOLS SHOWN HERE MAY NOT ALL BE REFLECTED ON PLANS) **SYMBOLS**



LIGHTING FIXTURE ON EMERGENCY POWER	
FLUORESCENT FIXTURE ON EMERGENCY POWER	
CONNECTION	
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ν *)	₩ #	#	1		\(\phi\)	#	∌	∯ ମୁ	~~		0	SWITCHES	R F C F	A HEIGH	NOIE:	20) (0)	0		þ	,	<u>-</u>
										<i>÷</i>	•			RECEDTACLES -	NOTED O		•						þ	>	-⊗
i	SNGLE POLE SWITCH	<u>)</u> 2 1	RECEPTACLE ON EMERGENCY POWER	QUADRAPLEX RECEPTACLE ISOLATED GROUND TYPE	DUPLEX RECEPTACLE ISOLATED GROUND TYPE	DUPLEX RECEPTACLE SPLIT WIRED	מכטמאטן דרא ארכנו וטכנר פסובר:	OHADRADIEY RECEDTACLE OHT ET	DUPLEX RECEPTACLE WITH GROUND FAULT INTERRUPTER	COUNTER (THIS APPLIES TO <u>ALL</u> TYPES OF OUTLETS) (CONFIRM HEIGHT AND LOCATION)	DUPLEX RECEPTACLE—SLASH INDICATES OUTLET MOUNTED ABOVE	SINGLE CONVENIENCE RECEPTACLE		- 15" (TO ROTTOM OF DEVICE) AFF	ALL CONVENIENCE COLLETS AND LIGHTING SWITCHES SHALL BE MOONTED AT A HEIGHT TO MEET OR EXCEED THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS. UNLESS NOTED OTHERWISE, THESE SHALL BE:	OUT ETS AND LIGHTING SWITCHES SHALL BE MOUNTED AT			FLOOR OUTLET — DEVICE INDICATED	JUNCTION BOX WITH FLEXIBLE METALLIC CONDUIT CONNECTION TO EQUIPMENT	JUNCTION BOX	PHOTOCELL PHOTOCELL	TRACK LIGHTING		EXIT LIGHTING, SHADED AREAS INDICATE FACE, WALL OR CEILING MOUNTED (DIRECTIONAL ARROWS AS INDICATED)
					WP	ONO	ПС	SWBD	SES	PNL	N.	NIC	GFI	GND	EXRR	EXR	EXP	Ę,	#	EDF	EC	DS	00	ATS	AFG
	CROIND FAILT SENSOR AND RELAY	EQUIPMENT ENCLOSURE	֓֞֝֟֝֟֝֟֝֟֝֟ ֖֖֓֞	ONE LINE SYMBOLS	WEATHERPROOF	UNLESS NOTED OTHERWISE	TELEPHONE TERMINAL CABINET	SWTCHBOARD	SERVICE ENTRANCE SECTION	PANELBOARD	NIGHT LIGHT	NOT IN CONTRACT	GROUND FAULT INTERRUPTER DEVICE	GROUND	EXISTING, REMOVE AND RELOCATE AS IN	EXISTING, REMOVE	EXPLOSION PROOF	EXISTING TO REMAIN	EXHAUST FAN	ELECTRIC DRINKING FOUNTAIN	EMPTY CONDUIT	DISTRIBUTION SECTION	CONDUIT ONLY	AUTOMATIC TRANSFER SWITCH	ABOVE FINISH GRADE (TO CENTER LINE

Υ	⊕	0			
CURRENT TRANSFORME	AMMETER WITH PHASE	VOLTMETER WITH PHAS	GROUND FAULT SENSO	EQUIPMENT ENCLOSURE	

 S_3

THREE WAY SWITCH

AUTOMATIC TRANSFER SWTCH-AMPERAGE AND NUMBER OF POLES INDICATED

√WW~□ 10 KW

ELECTRIC HEATER-SIZE IN KW AS INDICATED

MANUAL MOTOR STARTER W/ THERMAL OVERLOAD PROTECTION

TRANSFORMER

HORSE POWER RATED FAN SWITCH

FUSED DISCONNECT SWITCH, NF SUBSCRIPT INDICATES NON-FUSED

MOTOR CONTROLLER SIZE AS INDICATED

MOTOR, SIZE AND RATING INDICATED

EXISTING CIRCUIT - REMOVE AS INDICATED

)RY-TYPE STEP-DOWN)HASE INDICATED

EXISTING CONDUIT TO REMAIN. PROVIDE NEW CONDUCTORS AS SHOWN

COMBINATION MOTOR CONTROLLER & DISCONNECT SWITCH

GENERAL

COORDINATE SCHEDULE OF CONSTRUCTION WITH THE OWNER, OTHER TRADES AND UTILITIES INVOLVED BEFORE INSTALLATION OF UNDERGROUND FEEDERS, TRENCHING, ETC.

USE EXTREME CAUTION DURING EXCAVATION. THE CONTRACTOR SHALL BE REQUIRED TO HIRE THE SERVICES OF AN UNDERGROUND UTILITIES LOCATING SERVICE. LOCATE EXISTING UNDERGROUND PIPING, CONDUITS, ETC. LOCATE AND PROTECT ANY BURIED UTILITIES IN AREAS OF EXCAVATION.

CONDUIT STUB-OUT, BUSH CAP AND PERMANENTLY MARK LOCATION.

CONDUIT CONCEALED IN OR UNDER FLOOR CONSTRUCTION

NDICATES DRAWOUT DEVICE

CONDUIT CONCEALED IN CEILING OR WALL CONSTRUCTION

OUTLET OR SWITCH CONTROL INDICATION

WALL DIMMER, 1500 WATT MINIMUM, LUTRON NOVA SERIES

FOUR WAY SWITCH

EXISTING DEVICES ARE INDICATED AS DASHED

DRAWINGS SHOW EXISTING CONDITIONS TO SHOW EXISTING BUILDINGS, SITE DE GUARANTEED. VERIFY EXACT LOCATIONS EQUIPMENT, ETC. VERIFY ALL SITE AND

OF THE SITE.AN ATTEMPT HAS BEEN MADE TAILS, ETC., BUT ACCURACY CANNOT BE OF ALL CIRCUITS, CONDUITS, PIPING, BUILDING DETAILS.

GROUT AND SEAL ALL CONDUIT PENETI PRESERVE FIRE RATING AND WATERTIGI

RATIONS OF WALLS AND FLOOR SLABS TO HT INTEGRITY.

ELECTRICAL SYMBOLS AND NOTES

KYRENE de la MARIPOSA **ELEMENTARY SCHOOL**

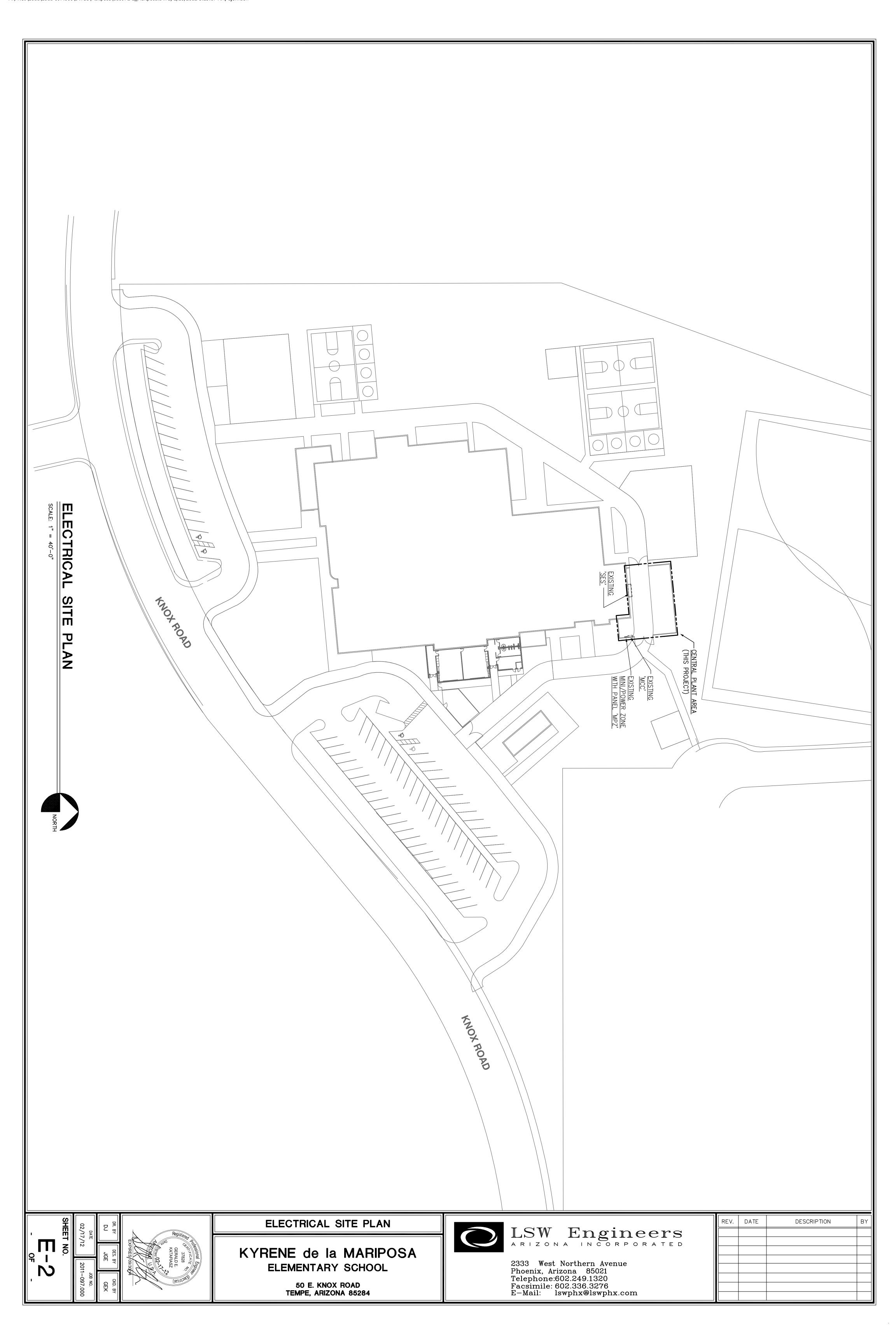


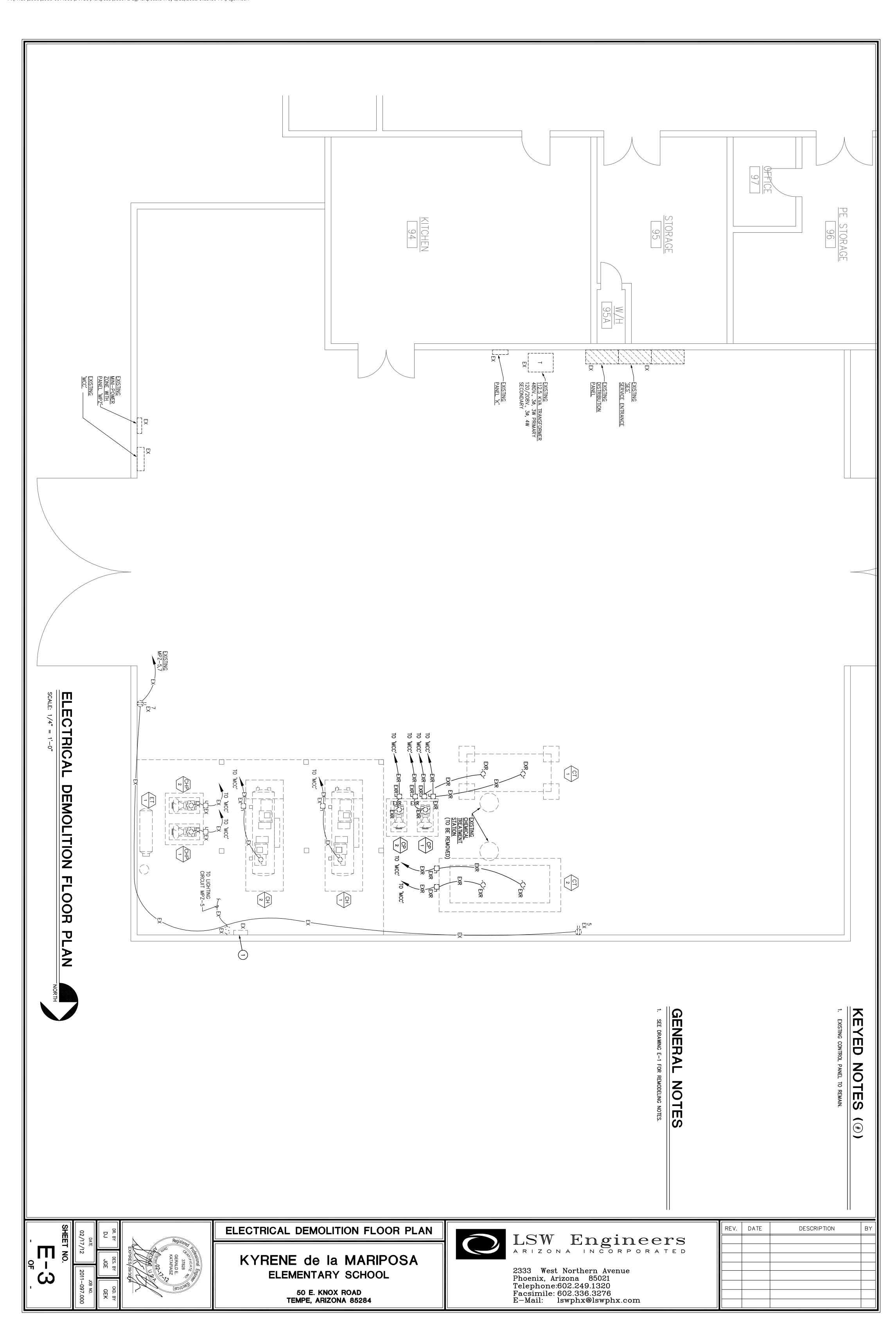
Engineers West Northern Avenue Phoenix, Arizona 85021
Telephone:602.249.1320
Facsimile: 602.336.3276
E-Mail: lswphx@lswphx.com

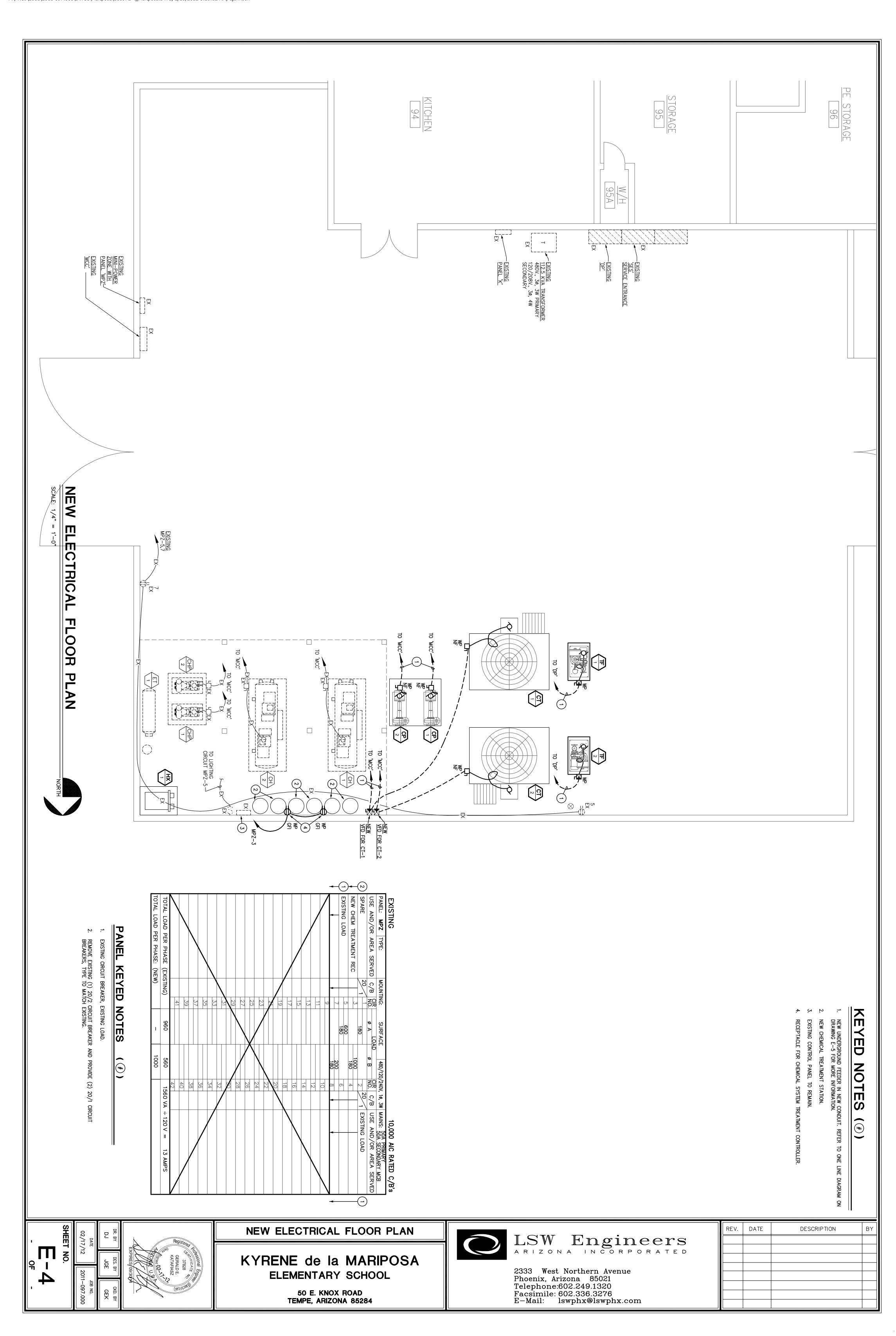
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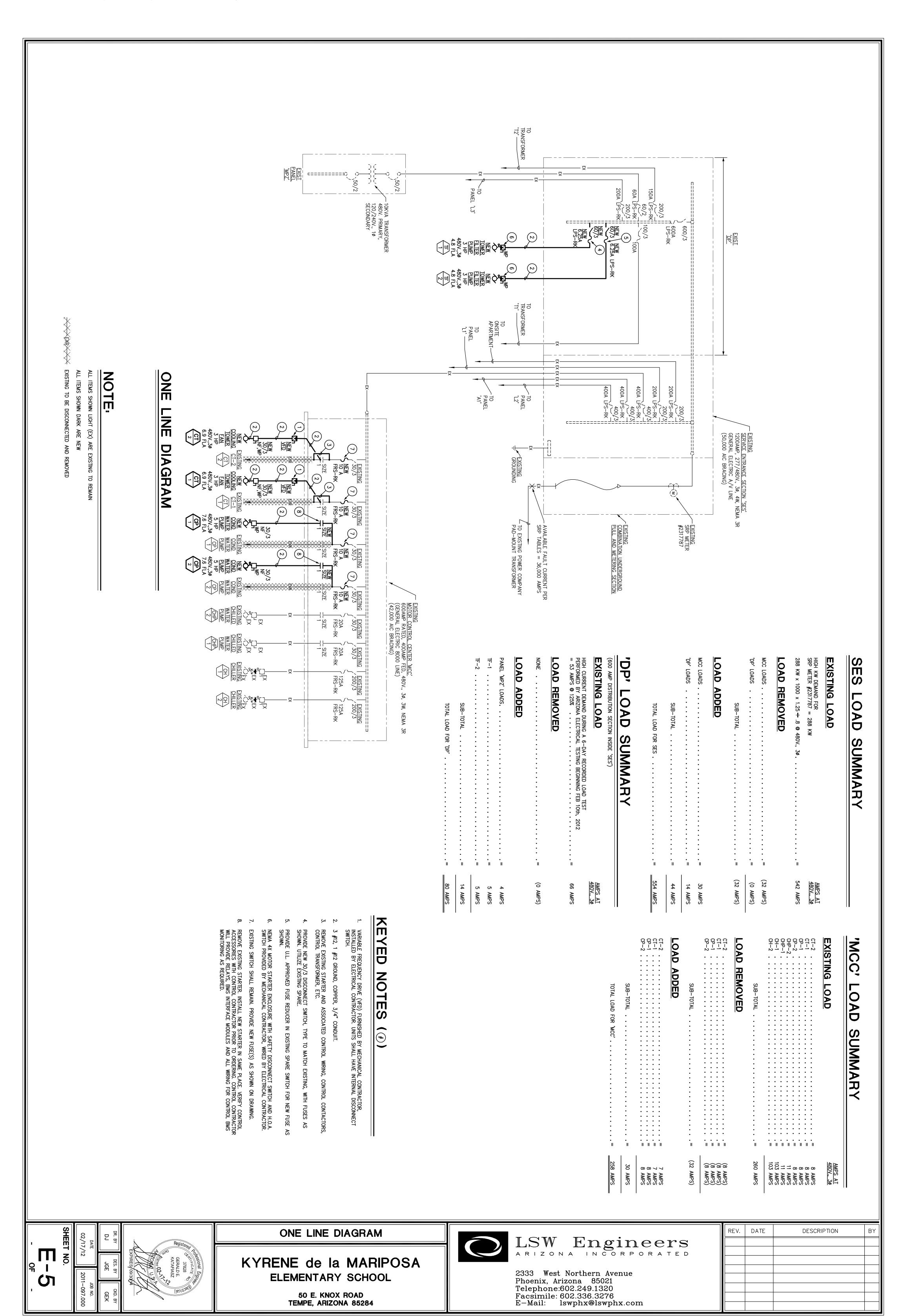
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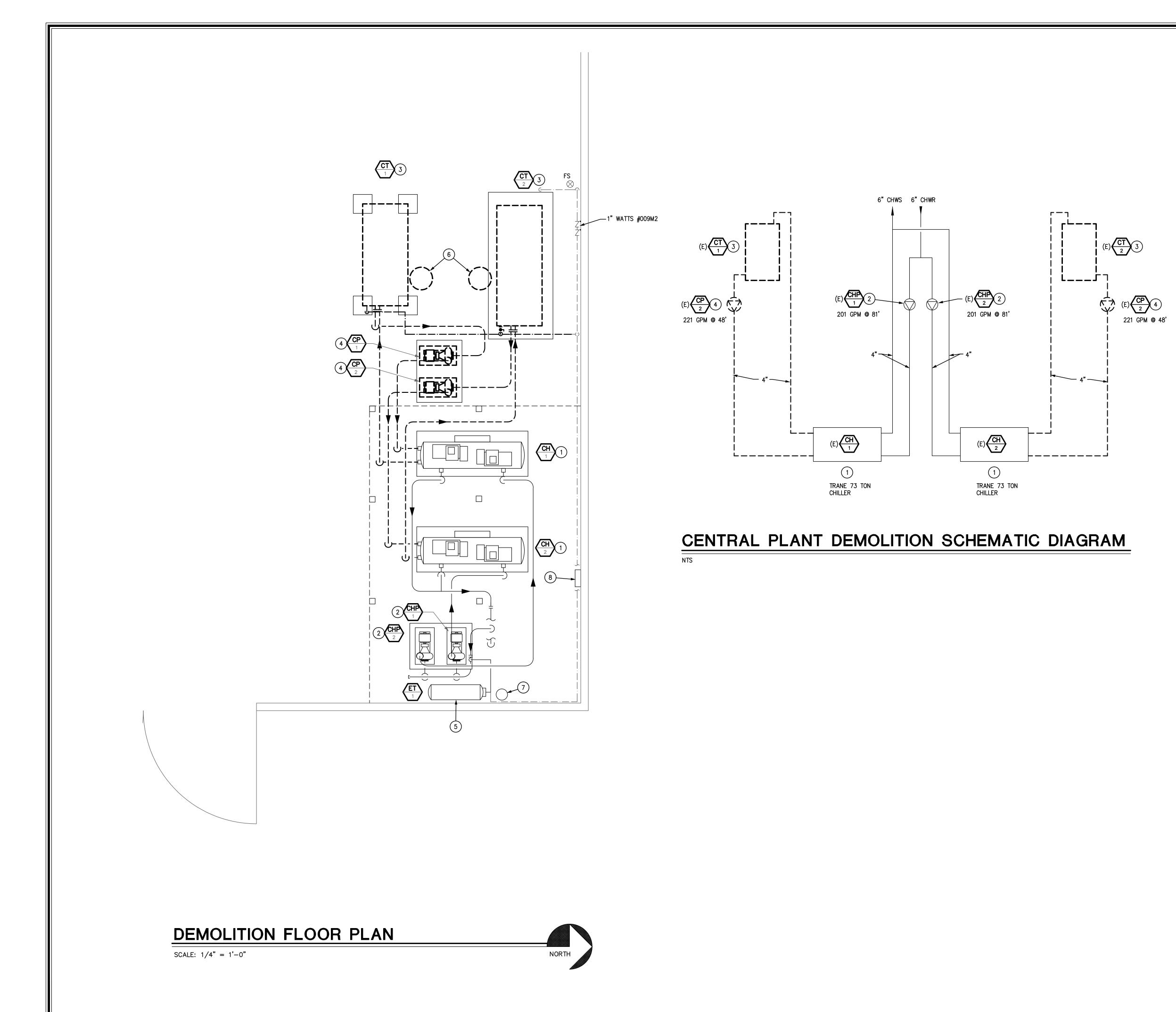
50 E. KNOX ROAD TEMPE, ARIZONA 85284











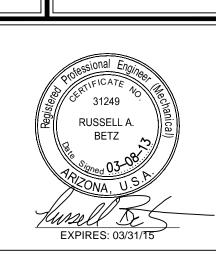
KEYED NOTES (#)

- 8. EXISTING CONTROL PANEL TO REMAIN.

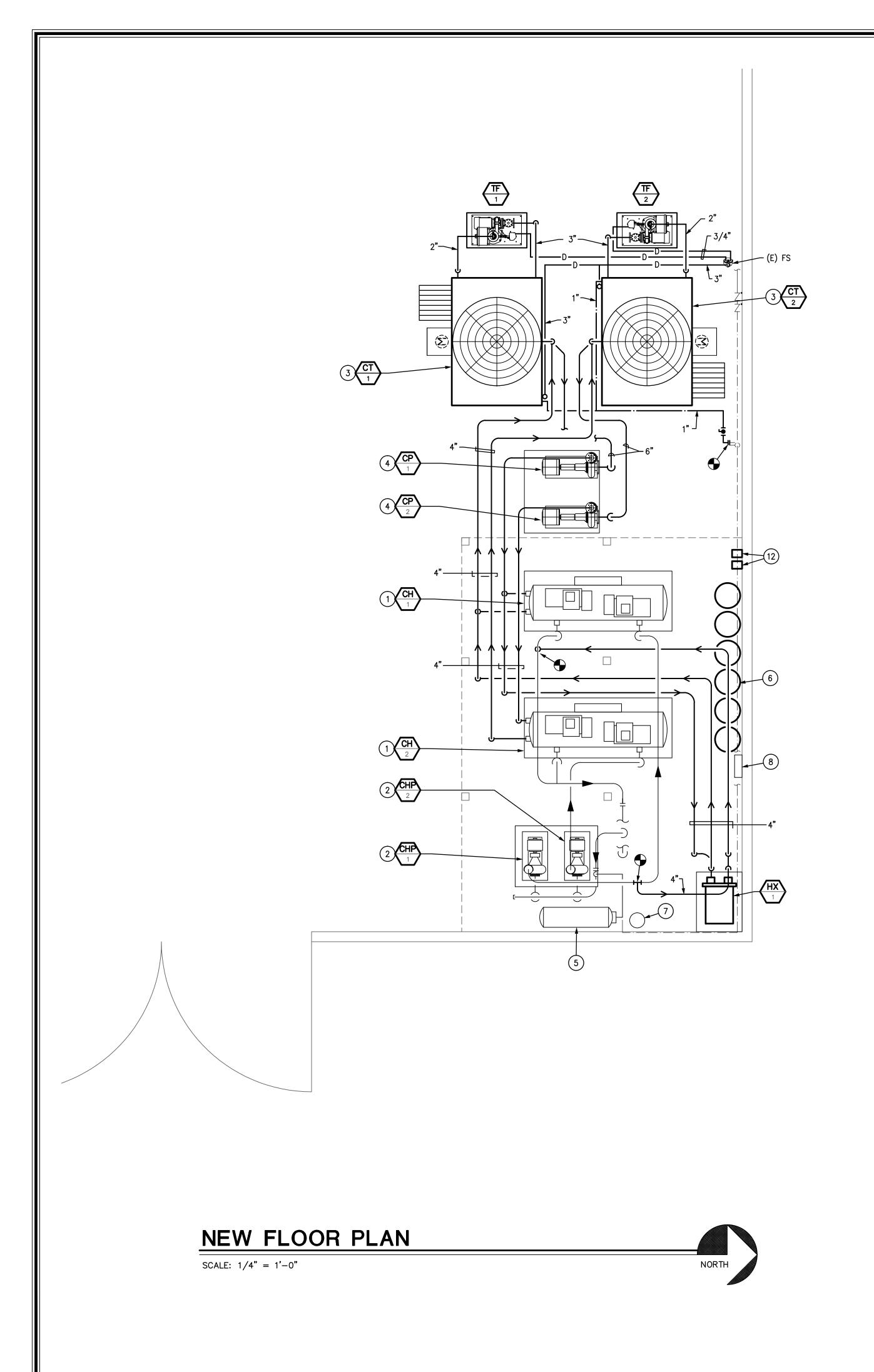
1. EXISTING CHILLER TO REMAIN.

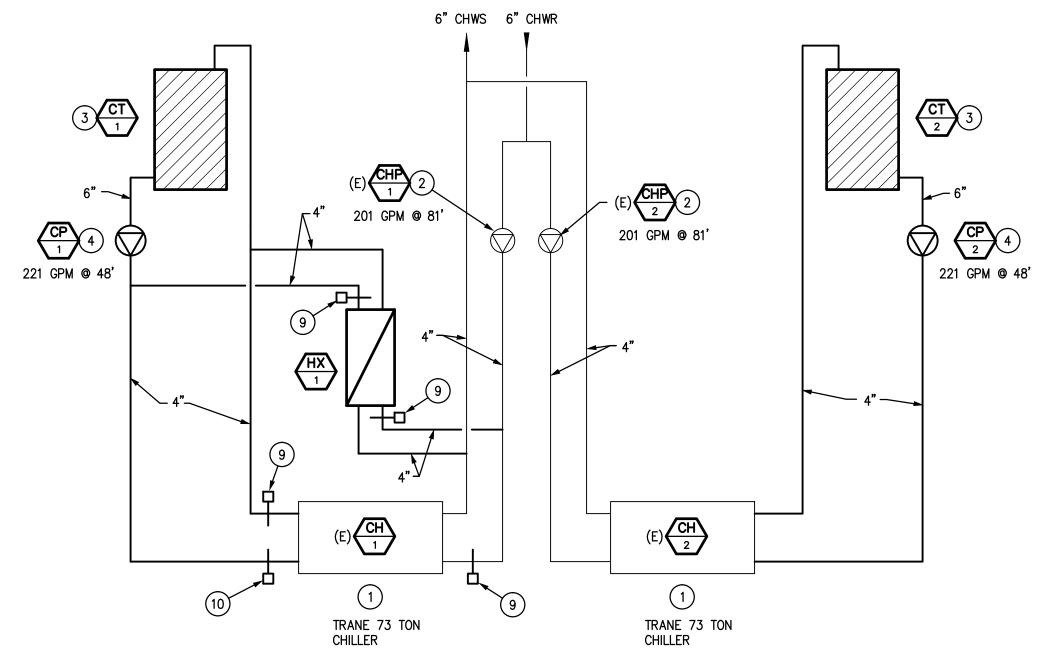
6. REMOVE EXISTING CHEMICAL TREATMENT STATION.

7. EXISTING POT FEEDER TO REMAIN.



02/17/12





CENTRAL PLANT NEW SCHEMATIC DIAGRAM

KEYED NOTES (#)

- 1. EXISTING CHILLER TO REMAIN.
- 2. EXISTING CHILLED WATER PUMP TO REMAIN.
- 3. NEW COOLING TOWER AND ASSOCIATED PIPING.
- 4. NEW TOWER CONDENSER PUMP.
- 5. EXISTING EXPANSION TANK TO REMAIN.
- 6. NEW CHEMICAL TREATMENT STATION.
- 7. EXISTING POT FEEDER TO REMAIN.
- 8. EXISTING CONTROL PANEL TO REMAIN.
- 9. NEW TWO-POSITION MOTOR OPERATED VALVE.
- 10. NEW HEAD PRESSURE MODULATING MOTOR OPERATED VALVE CONTROLLED BY CHILLER
- 11. CONNECT TO EXISTING TOWER MAKE-UP WATER.
- 12. NEW COOLING TOWER VFD'S.

GENERAL NOTES:

PROVIDE WHEEL HANDLED GEAR DRIVE ACTUATORS ON ALL BUTTERFLY VALVES.



02/17/12

		F	PLATE	AND	FRAN	ME HE	AT E	XCHA	NGEF	RSCH	IEDUL	E	
						COLD	SIDE			НОТ	SIDE		
MARK	AREA SERVED	MANUFACTURER	MODEL	MBH	GPM	MAX ΔP (FT)	ENT WTR TEMP (°F)	LVG WTR TEMP (°F)	GPM	MAX ΔP (FT)	ENT WTR TEMP (°F)	LVG WTR TEMP (°F)	REMARKS
HX-1	CH-1 / CT-1	MUELLER	AT40MH/HV	804	221	15.7	50.0	57.3	201	18.6	61.0	53.0	4" CONN., 48 PLATES

				PU	MP SO	CHE	ULE	=					
					2511	HEAD	MIN	MAX		MO	TOR		
MARK	AREA SERVED	MANUFACTURER	MODEL	TYPE	GPM	(FT) H20	EFF %	NPSHR (FT)	HP	BHP	RPM	V/PH	REMARKS
CP-1	CT-1	B & G	2-1/2 BB	1510	221	45	72	7.0	5	3.7	1750	480/3	123
CP-2	CT-2	B & G	2-1/2 BB	1510	221	45	72	7.0	5	3.7	1750	480/3	123

- 1) PROVIDE WITH NON OVERLOADING MOTOR.
- 2 PROVIDE WITH TEFC MOTOR.
- 3 PROVIDE WITH PREMIUM EFFICIENCY MOTOR (5 HP OR ABOVE).

				JLINC		WER	201					
					WATER			FAN S	ECTION		OPER	
MARK	AREA SERVED	MANUFACTURER	MODEL	GPM	INLET °F	OUTLET °F	CFM	WB ℉	HP	V/PH	WEIGHT LBS	REMARKS
CT-1 & 2	CH-1 & 2	EVAPCO	USS-19-56L	221	95	85	22,600	78	3 HP	460/3	5,100	1 114% CAPACIT
	 	 										
CT-1 & 2	CH-1 & 2	EVAPCO	AT-19-56L	221	95	85	22,600	78	3 HP	460/3	5,100	(2) 114% CAPACIT

- PROVIDE WITH INVERTER DUTY MOTOR, LADDER & EXTENSION, REINFORCED BASIN FOR ALT. STEEL SUPPORT, SUMP SWEEPER PIPING, ALL STAINLESS STEEL AND WELDED STAINLESS STEEL BASIN, BOTTOM SUMP & DRAIN & VIBRATION SWITCH.
- PROVIDE WITH INVERTER DUTY MOTOR, LADDER & EXTENSION, REINFORCED BASIN FOR ALT. STEEL SUPPORT, SUMP SWEEPER PIPING, BOTTOM SUMP & DRAIN & VIBRATION SWITCH.

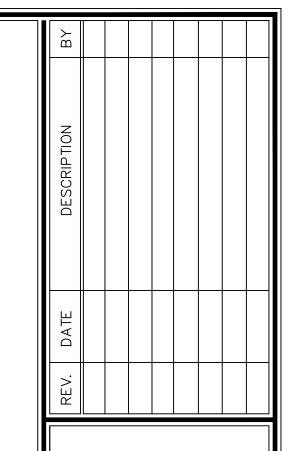
			TOV	VER FIL	TER	SCH	IEDUl	_E
						МС	OTOR	
MARK	AREA SERVED	AREA SERVED MANUFACTURER MODEL TYPE GPM		GPM	HP	V/PH	REMARKS	
TF-1 & 2	CT-1 AND CT-2	LAKOS	TCI-0065-CMBV	CENTRIFUGAL SEPARATOR	65	3	460/3	123

- NOTES:

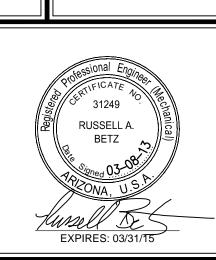
 1 PROVIDE WITH NON OVERLOADING TEFC MOTOR.
- 2 PROVIDE WITH AUTOMATIC PURGE VALVE.
- 3 PROVIDE WITH CONTROL PANEL, INCLUDING STARTER W/ OVERLOAD, HOA SELECTOR SWITCH AND NEMA-4X ENCLOSURE.

	MECH	ANICAL LEGEND
SYMBOL	ABBR	DESCRIPTION
CHWS	— CHWS	CHILLED WATER SUPPLY
CHWR	— CHWR	CHILLED WATER RETURN
CWS	— cws	CONDENSER WATER SUPPLY
CWR	— CWR	CONDENSER WATER RETURN
CD	— CD	CONDENSATE DRAIN
D	— D	DRAIN
	_	BALL VALVE
<u>i</u> v	— СНК	CHECK VALVE
——————————————————————————————————————	_	BUTTERFLY VALVE
——₩	— GV	GATE VALVE
	_	STRAINER WITH VALVE AND THREADED HOSE CONNECTION
——————————————————————————————————————	_	UNION
	_	FLEXIBLE PIPE CONNECTION
	_	THERMOMETER
<u> </u>	_	PRESSURE GAUGE
FS	F.S.	FLOW SWITCH
C	DN	RISER DOWN
0	UP	RISER UP
•	POC	POINT OF CONNECTION

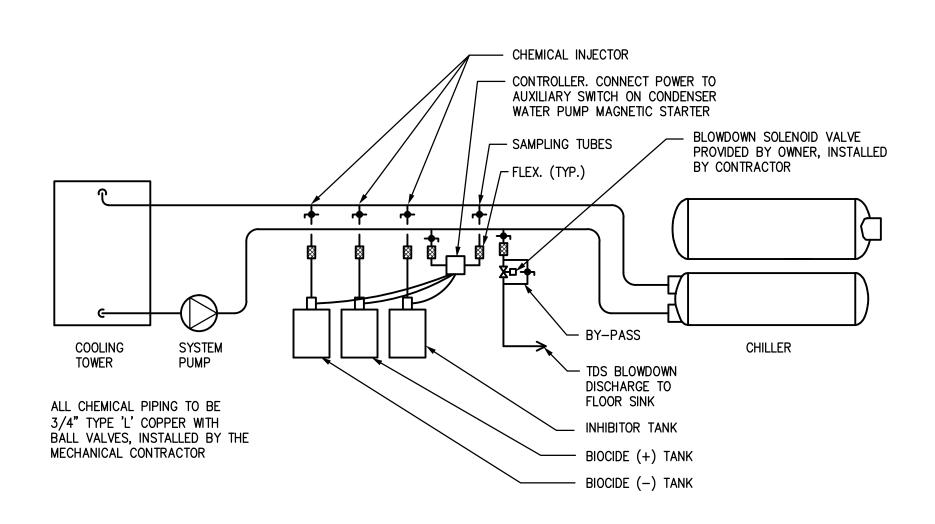
		REVIATION	
Ą	AMPS	LWB	LEAVING WET BULB TEMPERATURE
AFF	ABOVE FINISHED FLOOR	MAX	MAXIMUM
9	AT	МВН	THOUSAND BTU PER HOUR
AD	ACCESS DOOR	MCA	MINIMUM CIRCUIT AMPS
AP	ACCESS PANEL	MCC	MOTOR CONTROL CENTER
٩V	AUTOMATIC AIR VENT	MECH	MECHANICAL
3DD	BACKDRAFT DAMPER	MFCB	MAXIMUM FUSE OR CIRCUIT BREAKER
3HP	BRAKE HORSEPOWER	MIN	MINIMUM
3TUH	BRITISH THERMAL UNITS PER HOUR	MV	MANUAL AIR VENT
CAP	CAPACITY	NC	NORMALLY CLOSED
CFM	CUBIC FEET PER MINUTE	NIC	NOT IN CONTRACT
CLG	CEILING	NO	NORMALLY OPEN
OB	DRY BULB TEMPERATURE	NO OR #	NUMBER
DIA	DIAMETER	NPSHR	NET POSITIVE SUCTION HEAD REQ'D
DIFF	DIFFERENCE	NTS	NOT TO SCALE
ON	DOWN	OBD	OPPOSED BLADE DAMPER
OWG	DRAWING(S)	OSA	OUTSIDE AIR
EXH	EXHAUST	ov	OUTLET VELOCITY
EAT	ENTERING AIR TEMPERATURE	PD	PRESSURE DROP
EDB	ENTERING DRY BULB TEMPERATURE	PHG	PHASE
EFF	EFFICIENCY	PSI	POUNDS PER SQUARE INCH
ELEV	ELEVATION	PSIG	POUNDS PER SQUARE INCH GAUGE
ESP	EXTERNAL STATIC PRESSURE	RA	RETURN AIR
EWB	ENTERING WET BULB TEMPERATURE	REQ'D	REQUIRED
EXT	EXTERNAL	RH	RELATIVE HUMIDITY
F	DEGREES FAHRENHEIT	RM	ROOM
-D	FIRE DAMPER	RPM	REVOLUTIONS PER MINUTE
F	FINISH FLOOR	SA	SUPPLY AIR
-LA	FULL LOAD AMPS	SCFM	CFM, STANDARD CONDITIONS
FLEX	FLEXIBLE	SD	SMOKE DETECTOR
-PM	FEET PER MINUTE	SFD	SMOKE AND FIRE DAMPER
FPS	FEET PER SECOND	SP	STATIC PRESSURE
-S	FLOW SWITCH	TEMP	TEMPERATURE
-T	FOOT OR FEET	UNO	UNLESS NOTED OTHERWISE
GA	GAGE OR GAUGE	VD	VOLUME DAMPER
GAL	GALLON(S)	VEL	VELOCITY
4T	HEIGHT	V	VOLT
HP	HORSEPOWER	w	WATTS
'' ∃Z	HERTZ	". w/	WITH
N	INCH OR INCHES	"/ W/O	WITHOUT
<w< td=""><td>KILOWATT</td><td>w_G</td><td>WATER GAUGE</td></w<>	KILOWATT	w _G	WATER GAUGE
_BS	POUNDS	WT	WEIGHT
_DB	LEAVING DRY BULB TEMPERATURE	ø	ROUND, DIAMETER



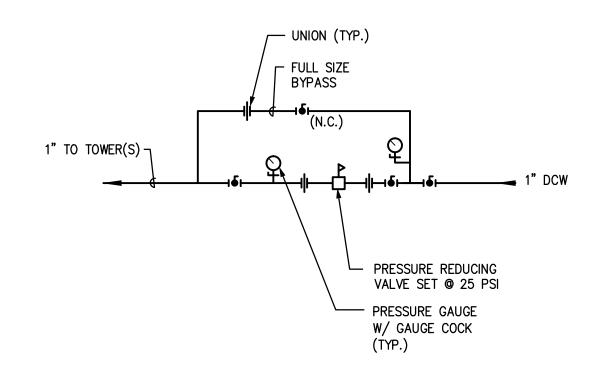




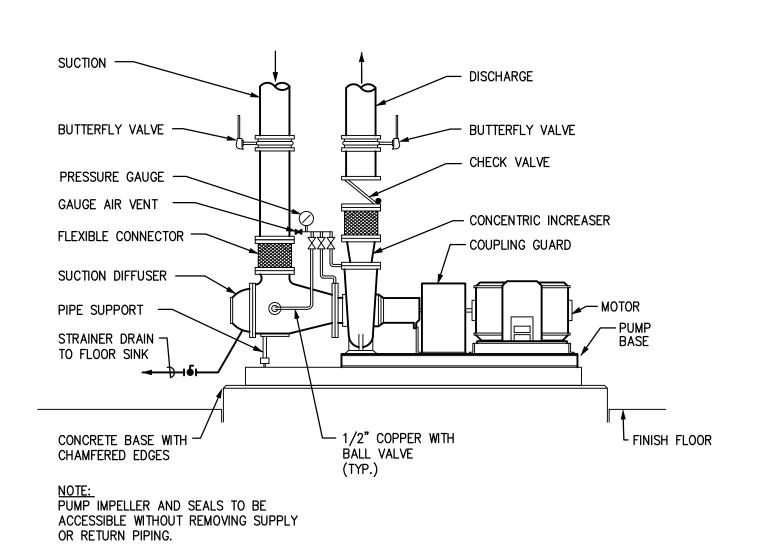
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TOWER WATER TREATMENT DETAIL

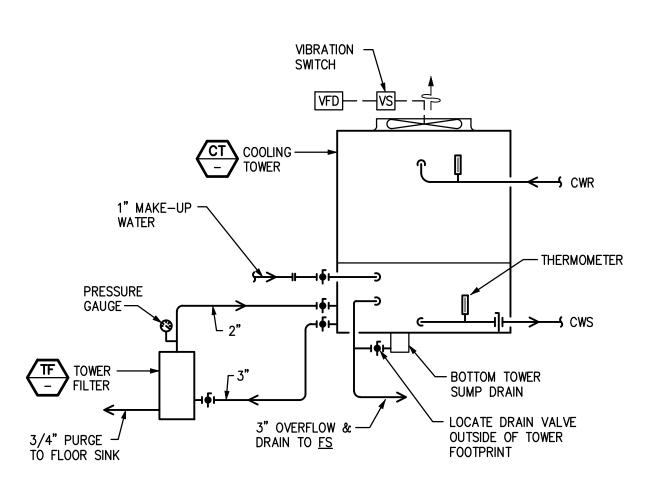


TOWER WATER MAKE-UP PIPING DIAGRAM



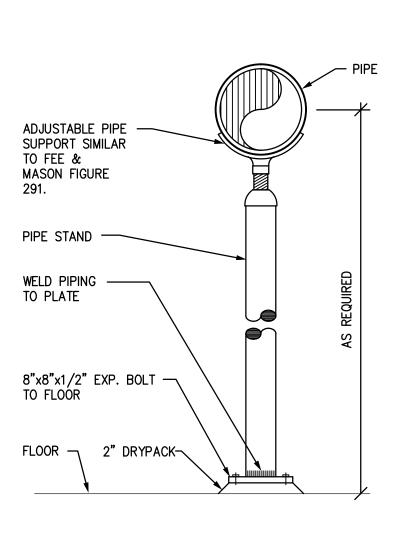
BASE MOUNTED PUMP DETAIL

NTS



COOLING TOWER DIAGRAM

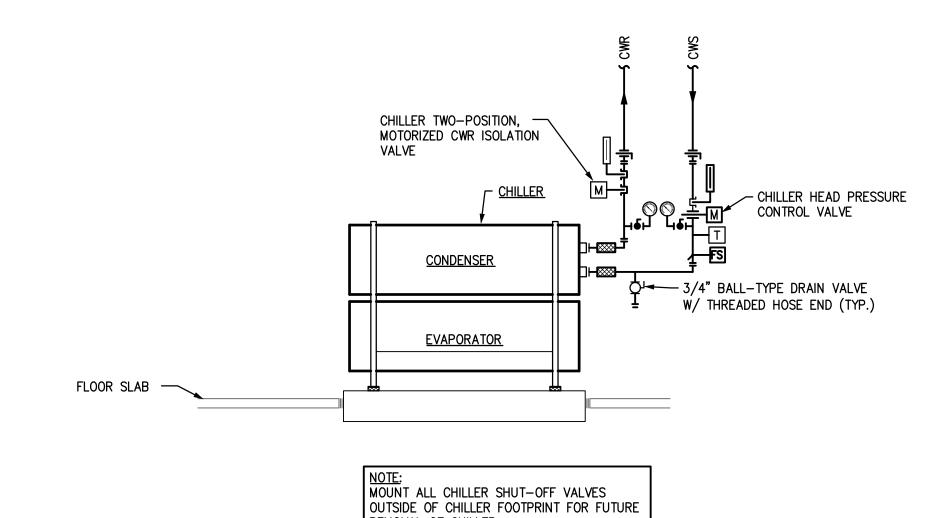
NTS MAKE-UP WATER, TOWER DRAIN AND ALL FILTER PIPING SHALL BE COPPER.



PIPE STAND DETAIL

GENERAL NOTES:

- PROVIDE 3/4" WELD-O-LETS FOR CONDENSER AND CHILLED WATER CHEMICAL TREATMENT PIPING.
- PROVIDE 3/4" WELD-O-LETS FOR CONDENSER, CHILLED WATER AND THE CONTROL SYSTEM SENSORS. VERIFY QUANTITY AND LOCATIONS. SEE #3 BELOW.
- ALL WELD-O-LETS, THERMOMETER, PETE'S PLUGS, CONTROLS, GAUGES, ETC., SHALL BE LOCATED 'BELOW' THE EQUIPMENT'S ISOLATION BUTTERFLY VALVE.



WATER COOLED CHILLER DIAGRAM

REMOVAL OF CHILLER.

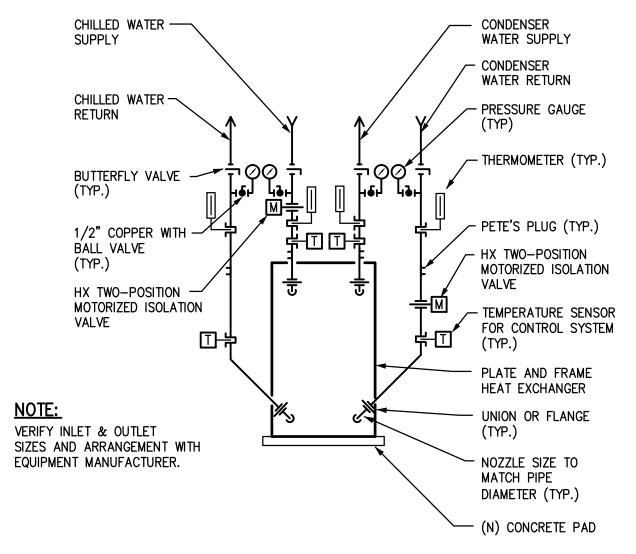
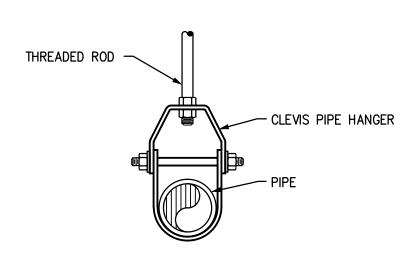
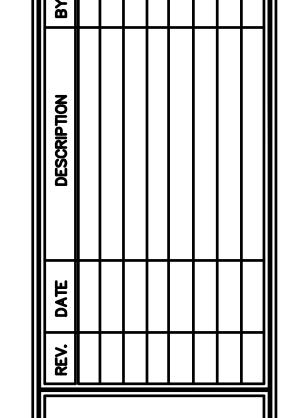


PLATE AND FRAME HEAT **EXCHANGER PIPING DETAIL**



NON-INSULATED PIPE SUPPORT DETAIL





MARIPOS/ SCHOOL

<u>a</u> de NT/ KYRENE ELEME



02/17/12

GERVASIO & ASSOC., INC.

CONSULTING ENGINEERS
77 EAST THOMAS ROAD, SUITE 120
PHOENIX, ARIZONA 85012
(602) 285-1720 • (602) 285-1530 (FAX)

JOB NO.:	[15]
BY:	RD

PARTIAL CALCULATIONS

JECT: _	KYRENE DE CA MANTPOSA-ME	SUPPL
	50 E. KNOX ROAD	
	TEMPE, ANIZONA 85084	
NT: _	LSW ENGINEERS	
	ITEM	SHEET
	DESIGN CRITERIA	D-1
	MECH. EQUIP. SUPPORT	M-1
	FOUNDATIONS	F-)
:		

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| Continue | Contin

EXPIRES 12/31/11

GERVASIO & ASSOC., INC.

CONSULTING ENGINEERS

(602) 285-1720 • 77 East Thomas Road, Suite 120

Phoenix, Arizona 85012

Date_	8/11	Job No	1151
Ву	RD	Sheet No.	D-1

GENERAL - DESIGN CRITERIA

CODE	2006 INTERNATIONAL BUILDING CODE
DESIGN CRITERIA	
DEAD LOADS:	ROOF: NA PSF
LIVE LOADS:	FLOOR: NA PSF ROOF: PSF
LATERAL LOADS:	FLOOR: PSF WIND: 90 MPH (3 SECOND GUST WIND SPEED), EXPOSURE C
	SEISMIC: DESIGN CATEGORY B , $S_{DS} = 0.23 \le 1.5$
ALLOWABLE STRESSES	
CONCRETE:	REGULAR WT. CONC. $fc = 3,000$ PSI
,	STRUCTURAL DESIGN BASED ON $f_c = 2,500$ PSI NO SPECIAL STRUCTURAL INSPECTION REQ'D.
*	
	•-
·	
REINF. STEEL:	ASTM A-615, GRADE <u>60</u> , $F_y = \underline{60}$ KSI
STRUCT. STEEL:	ROLLED SECTIONS: ASTM A-992, GRADE 50, $F_y = 50 \text{ KSI}$ PLATES, ANGLES AND CHANNELS: ASTM A-36, $F_y = 36 \text{ KSI}$ BOLTS: ASTM A-307 PIPES: ASTM A-53, GRADE B, $F_y = 35 \text{ KSI}$ TUBES: ASTM A-500, GRADE B, $F_y = 46 \text{ KSI}$ WELDING: E-70 SERIES ELECTRODES
<u>SOIL</u> :	Q MAX = 1500 PSF @ 16^{1} MIN. BELOW GRADE
	SOIL REPORT BY NONE
	DATED JOB #

GERVASIO	& ASSOC.	INC.
CONCULTING	ENGINEED	æ

(602) 285-1720 • 77 East Thomas Road, Suite 120 PHOENIX. ARIZONA 85012-3115

HRVDBA	8 HCAGOS 1 COOC	CING TOLUER BEAMS HILL HILL
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	VIT SIZE: 5-	= 5100 151 -117/8" x 8'-51/2" x 10'-8 14"
	BEAM SANV	E 1970" HE HELLE H
		1= 9-0"
	1 9:01	
		11 CUI= 6100 = 3060 = 362RF 2675 8572 = 362RF
	74 W8X24	
		1/2/2/10/026/972
		(0,362+0,026)(9) ² 3.93 ¹ K
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Title: Kyrene Cooling Towers

Dsgnr: RD Description:

Job # 1151 M - Z Date: 4:12PM, 2 OCT 11

Scope:

Rev: 580002 User: KW-0604298, Ver 5.8.0, 1-Dec-2003 (c)1983-2003 ENERCALC Engineering Software Page 1
1151 kyrene mech. units.ecw:Calculations Steel Beam Design

Description

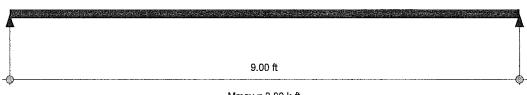
Kyrene - Lagos Cooling Tower

General Informa	General Information Code Ref: AISC 9th ASD, 1997 UBC, 2003 IBC, 2003 NFPA 5				003 IBC, 2003 NFPA 5000		
Steel Secti	on : W8X24		Pinned-Pin	ned	Fy Load D	Ouration Factor	50.00ksi 1.00
Center Span Left Cant. Right Cant Lu : Unbraced	I Length	9.00 ft 0.00 ft 0.00 ft 9.00 ft	Bm Wt. Add	ded to Loads ot Together	Elastic	Modulus	29,000.0 ksi
Distributed Load	ls					Note! Short Terr	m Loads Are WIND Loads.
DL LL ST Start Location End Location		#2	# 3	# 4	# 5	# 6	# 7 k/ft k/ft k/ft ft ft
Summary					,		Beam OK

Summary			Static Load Case	Beam OK Governs Stress
Using: W8X24 section, Span = 9.0 End Fixity = Pinned-Pinned, Lu = 9				
•	Actual	Allowable		
Moment fb : Bending Stress fb / Fb	3.909 k-ft 2.244 ksi 0.075 : 1	52.250 k-ft 30.000 ksi	Max. Deflection Length/DL Defl Length/(DL+LL Defl)	-0.024 in 4,545.1 : 1 4,545.1 : 1
Shear fv : Shear Stress	1.737 k 0.894 ksi	38.857 k 20.000 ksi	,	
fv / Fv	0.045 : 1			

Fa calc'd per Eq. E2-2, K*L/r > Cc I Beam, Major Axis, $(102,000 * Cb / Fy)^{.5} \le L/rT \le (510,000 * Cb / Fy)^{.5}$, Fb per Eq. F1-6 I Beam, Major Axis, Fb per Eq. F1-8, Fb = 12,000 Cb Af / (I * d)





Mmax = 3.90 k-ft

Dmax = -0.0237 in

Lmax = 1.737 k

Vmax @ left = 1.737 k

Rmax = 1.737 k

Vmax @ rt = 1.737 k

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By Sheet No. F-1

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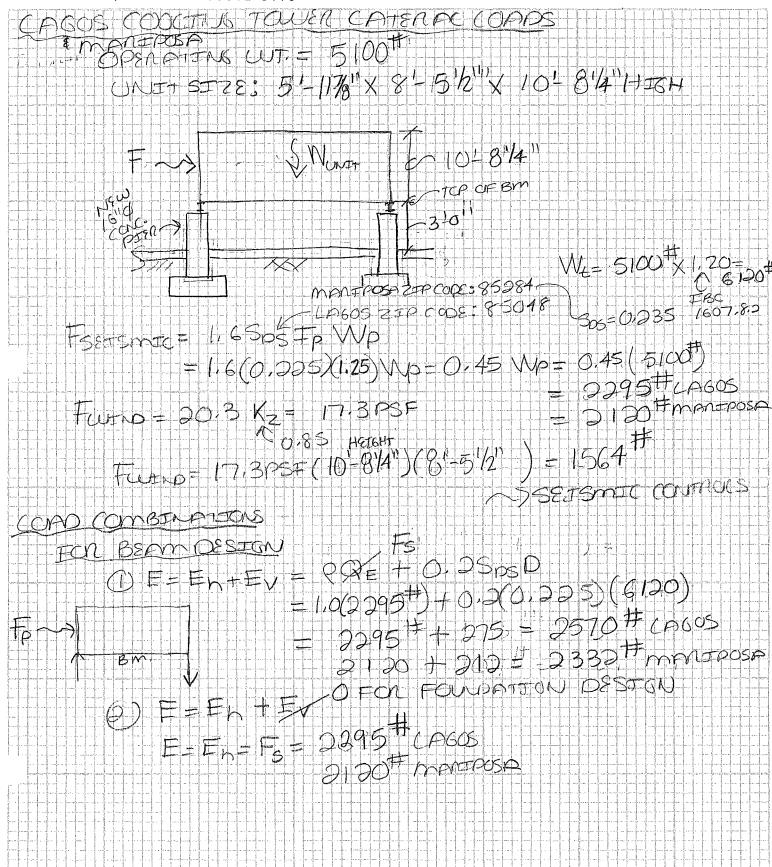
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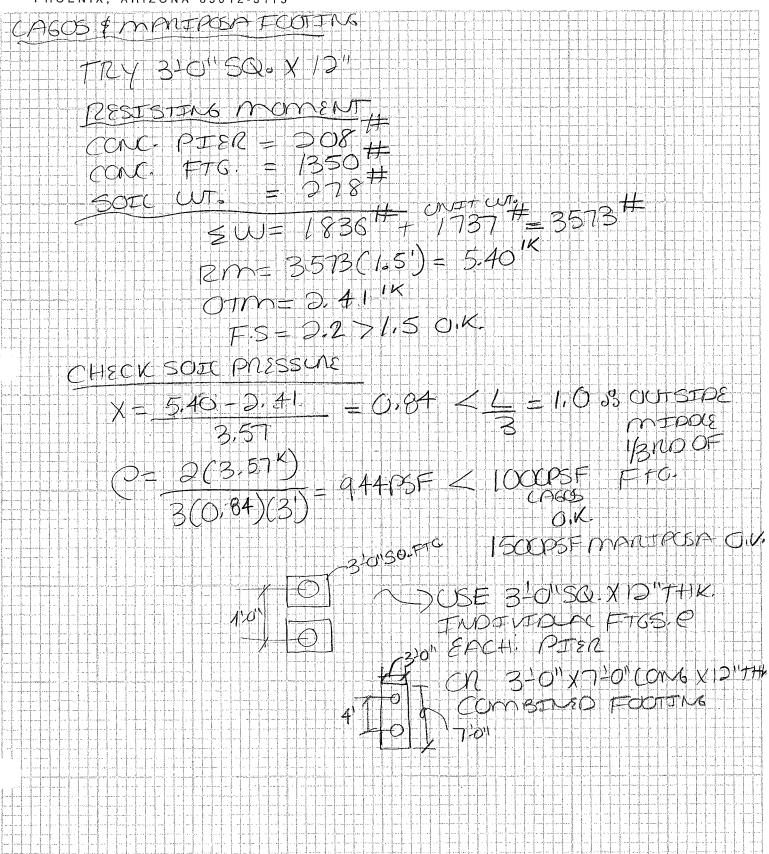
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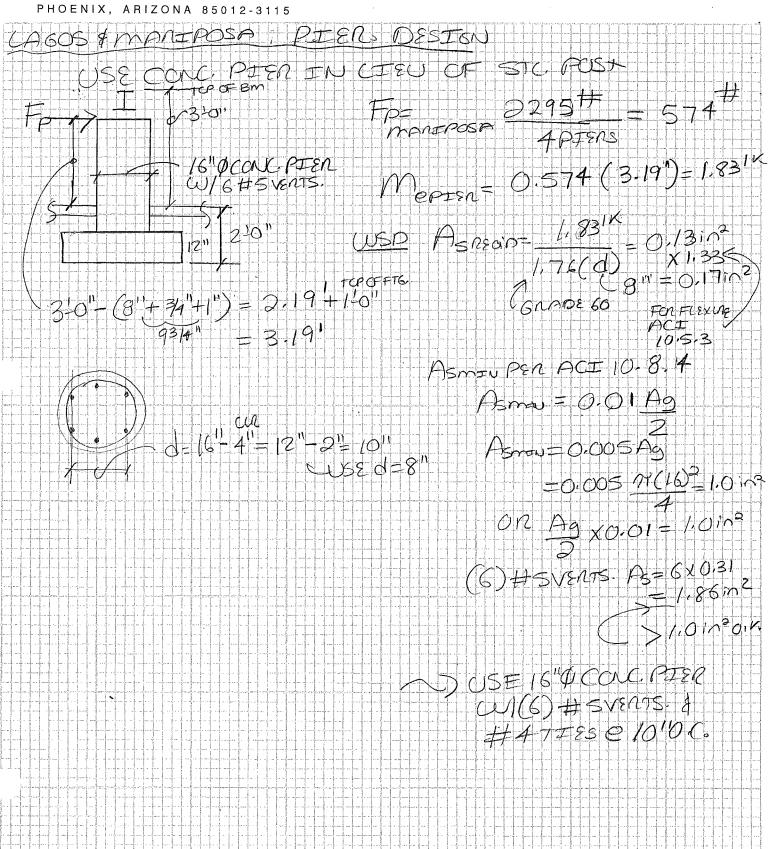


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